5.1.5
8/19/02

DEWATERING PIT
SAMPLING AND ANALYSIS PLAN
TO SUPPORT REMEDIAL DESIGN

SIMPLOT PLANT AREA
EASTERN MICHAUD FLATS SUPERFUND SITE

MFG, Inc.
consulting scientists and engineers

DEWATERING PIT
SAMPLING AND ANALYSIS PLAN
TO SUPPORT REMEDIAL DESIGN

SIMPLOT PLANT AREA
EASTERN MICHAUD FLATS SUPERFUND SITE

POCATELLO, IDAHO

August 19, 2002

Prepared for:

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1.0 INTRODUCTION

This document presents a sampling and analysis plan (SAP) for collection of Toxicity Characteristic Leaching Procedure (TCLP) data for residual solids in the Dewatering Pit in the Simplot Plant Area of the Eastern Michaud Flats (EMF) Superfund Site, located near Pocatello, Idaho. The data are being collected to support remedial design.

Remediation of the Dewatering Pit is part of the comprehensive remedy for the EMF Site as described in the Record of Decision (ROD; USEPA, 1998) and subsequent Consent Decree for the Simplot Plant Area (USEPA, 2002). A Pre-Final Remedial Design Report (RDR)/Draft Remedial Action Work Plan (RAWP) for the Dewatering Pit (Simplot, 2002) was submitted to EPA on August 5, 2002.

The scope of work, objectives and performance standard for this portion of the remedial action are specified in the Consent Decree Statement of Work, as follows:

> *"The Dewatering Pit Element of Work includes excavation of phosphate ore residuals from the Dewatering Pit, disposal of excavated materials on the gypsum stack, covering the excavated area with soil and vegetation.*
>
> *a. The objective is to prevent incidental worker exposure to the solids in the Dewatering Pit by removing residual solids from the pit area.*
>
> *b. The performance standard for this Element of Work will be removal of residual Dewatering Pit solids as verified through confirmatory soil sampling."*

Although EPA's selected remedy specifies that excavated materials be relocated to the gypsum stack, Simplot wants to verify that the materials when excavated would not exhibit the Toxicity Characteristic, as determined by the TCLP test, prior to implementation of the action.

2.0 DATA QUALITY OBJECTIVES

A streamlined version of EPA's data quality objectives process (EPA, 2000) was used to develop a sampling and analysis approach and optimize the study design. This process allows for adequate data to be collected for decision-making purposes.

2.1 Statement of the Issue

As described above, the remedial action for the Dewatering Pit is specified as excavating residual solids and relocating them to the gypsum stack. Simplot wants to verify that the solids, when excavated, would not exhibit the Toxicity Characteristic, as determined by the TCLP test. If the materials are found to exhibit the Toxicity Characteristic, then the scope of the remedy will be revisited with EPA, and modifications will be made to the remedial design, as necessary.

2.2 Identify the Decision

The principal study question is would the residual solids, when excavated, exhibit the Toxicity Characteristic, as determined by the TCLP test. If the solids do exhibit the Toxicity Characteristic relocation to the gypsum stack would not be appropriate and the scope of the remedy for the Dewatering Pit will require reevaluation.

2.3 Identify Inputs to the Decision

Chemical data describing the average toxicity leaching characteristics will be required to make the decision described above. In particular, concentrations of arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver measured by TCLP testing will be required.

The EMF Site has undergone an exhaustive Remedial Investigation (RI) that found, in part, that site materials do not contain organic contaminants at levels of interest from either a risk or regulatory perspective (Bechtel, 1996). The residual materials in the Dewatering Pit are derived from excess phosphate ore and from pond solids from the period of start up for the ore slurry pipeline around 1991. Neither of these would be expected to contain organic contaminants at levels that could be of concern due to Toxicity Characteristics (as defined in 40 CFR 261.24).

2.4 Define the Study Boundaries

The study will be limited to the residual solids that are targeted for removal in the Dewatering Pit (see Figure 1 for location). Material characteristics are not expected to change with time and therefore a single sampling event will be performed.

The Dewatering Pit consists of three bermed areas. The surface area of the bottom of the eastern pit measures approximately 23,150 square feet. The surface area of the western pit is approximately 15,100 square feet, and the surface area of the small southern pit is 3,500 square feet. The berms are approximately eight feet high except on the side of Interstate 86, where the berms vary in height from eight to twelve feet. The berms are constructed of native soil and gravel that was excavated from the interior of the pits during construction. The solids within these pits consists primarily of phosphate ore residuals and solids precipitated by pH adjustment of irrigation waters, which can be visually recognized by their gray color in contrast to the light brown-colored native soil. During the RI, a single soil boring (S008B) was drilled within the eastern pit. The material encountered in the upper 2.5 feet of this boring consisted of residual solids.

2.5 Develop a Decision Rule

In terms of evaluating whether the materials would exhibit the Toxicity Characteristic when excavated during remedial action construction, the average characteristics of the material are important (material would be mixed both laterally and with depth by the excavation process). Therefore, a single composite sample will be collected from each of the three pits. The sampling is designed to represent the average characteristics in each of the three pits, and will be assessed using the TCLP test. If the TCLP leachate exceeds the concentrations shown in Table 1, the scope of the remedy will be revisited with EPA. If the concentrations are below the values shown in Table 1 (20 CFR 261.24), the excavated materials will be relocated to the gypsum stack, as specified in the Consent Decree Statement of Work.

Table 1
Toxicity Characteristic Concentrations

Constituent	Regulatory Level (mg/L)
Arsenic	5.0
Barium	100.0
Cadmium	1.0
Chromium	5.0
Lead	5.0
Mercury	0.2
Selenium	1.0
Silver	5.0

2.6 Specify Limits on Decision Errors

Multiple grab samples will be collected to provide a single composite sample to accurately describe the average characteristics within each pit area. Inspections of the Dewatering Pit conducted on August 8, 2002 found that the residual solid material appears to be homogeneous and no layering was observed. Based on this and the origin of the residual material, variability in the material characteristics within each pit area is expected to be small. The analytical methods used to measure metals concentrations will provide quantitative data that are directly comparable to the concentrations that will serve as the basis for decision-making.

3.0 SAMPLE COLLECTION

As described above, the Dewatering Pit consists of three bermed areas (Figure 1). In each bermed area, a single composite sample will be collected to be representative of the residual solids.

In the West Dewatering Pit grab samples will be collected from five locations (Figure 1). Inspection of this area indicates that the depth of residual solids is around five inches deep in the middle and less deep toward the edges. The material is loose, such that it is not possible to get a clean side cut to stand vertically. The material should therefore be relatively easy to sample. At each location a grab sample will be collected from the entire depth of residual solids. The five grab samples will be combined into one composite for the West Dewatering Pit.

In the East Dewatering Pit, the sampling approach will be the same as described above for the West Dewatering Pit. Sample collection locations are shown on Figure 1. Inspection of this area indicates that the residual solids are approximately 12 to 14 inches deep in the middle of the pit.

The South Dewatering Pit is a much smaller area and inspection found that residual solids are typically half an inch deep or less. Therefore, grab samples will be collected from three locations in this pit (see Figure 1) and combined to one composite sample.

4.0 FIELD AND LABORATORY METHODS

Field methods for collection of the residual solids samples are described in this section along with a listing of the laboratory methods that will be used.

4.1 Sample Collection

Material will be collected from the surface and from the side-walls of shallow test pits excavated within the residual solids material. At each location a grab sample will be collected to represent the entire depth of the material, which is visually different from the underlying soil. The volume of sample collected at a particular location will be proportional to the total depth of the material. Because the residual solids are loose, samples will be collected using a plastic or metal trowel and placed directly into a stainless steel bowl. Once all samples from an individual pit are collected the sample will be thoroughly mixed in the bowl and at least 500 grams placed into a plastic zip-lock bag. Immediately following sample collection, samples will be labeled and prepared for shipment to the analytical laboratory (see the Standard Operating Procedure in Appendix A). A field log will be maintained to document sample collection activities (see Section 5.4). Sample preservation requirements are shown on Table 2.

Table 2
Analytical Methods, Sample Preservation and Holding Times

Parameter	Analytical Method	Target Method Detection Limit (MDL) mg/L	Preservation and Storage Requirements	Holding Time (days)
Arsenic	EPA 1311/6010	0.040	4 ±2 °C	180
Barium	EPA 1311/6010	0.003	4 ±2 °C	180
Cadmium	EPA 1311/6010	0.003	4 ±2 °C	180
Chromium	EPA 1311/6010	0.010	4 ±2 °C	180
Lead	EPA 1311/6010	0.040	4 ±2 °C	180
Mercury	EPA 1311/7470	0.0002	4 ±2 °C	28
Selenium	EPA 1311/6010	0.05	4 ±2 °C	180
Silver	EPA 1311/6010	0.005	4 ±2 °C	180

If sampling equipment is to be re-used, follow the decontamination procedures outlined in the Standard Operating Procedure (SOP; Appendix A) will be followed. There is no need to decontaminate between locations for subsamples collected for a single composite sample.

4.2 Laboratory Methods

Analyses will be performed by SVL Analytical Inc. in Kellogg, Idaho. The analytes, laboratory methods, and preservation requirements are listed on Table 2.

5.0 QUALITY ASSURANCE AND QUALITY CONTROL

The procedures listed in this section will ensure that the data collected in the field, provided by the analytical laboratory are of appropriate quality to meet the data needs of this plan.

5.1 Data Uses

As noted in Section 2.0, the data resulting from this sampling will be used to determine if the currently-specified remedial action for the Dewatering Pit to excavate residual solids and dispose of them on the gypsum stack is appropriate. This will be achieved by TCLP testing and comparing the metals concentrations with the regulatory levels shown in Table 1.

5.2 Field Quality Control Procedures

Field quality control will entail decontamination of field sampling equipment and adherence to this plan and SOPs (Appendix A). These elements are described in Section 4.0. In addition, a duplicate sample will be collected from either the East or West Dewatering Pit cells. The sample will be obtained from the same locations and by the same method as the routine sample. The relative percent difference requirement for duplicate results is less than 30 percent.

5.3 Laboratory Quality Control

The sample collection methods and analytical methods were selected to ensure that laboratory analysis is sufficiently sensitive, accurate and precise to meet the data needs for this plan. The commercial laboratory used to provide the analyses listed in Table 2 will perform the requested analyses in accordance with the referenced EPA methods and will operate under an internal Quality Assurance Management Plan. The laboratory will provide the following information to support their analysis results for each parameter analyzed:

- Sample preparation method reference;
- Analytical method reference;
- Method detection limit;
- Reporting or practical quantitation limit;
- Units
- Shipment temperature;
- Analysis date;
- Laboratory control standard recovery;
- Matrix spike (MS) recovery;
- Matrix spike duplicate (MSD) recovery;
- MS/MSD relative percent difference;
- Initial and continuing calibration verification results (dated);
- Chain of custody record; and
- Sample condition upon receipt.

The accuracy of laboratory analysis results will be evaluated using the results for recovery from laboratory control samples (LCSs) and matrix spike (MS) samples. The precision of laboratory analyses will be evaluated using results from duplicate analyses of MS samples. Criteria for acceptance of laboratory data for specific data uses are as follows:

- LCS recoveries within 80 to 120 percent
- MS recoveries within 70 to 130 percent
- MS/MSD RPD less than 25 percent.

These data will be reviewed to confirm that the data meet the data quality objectives for data use. Any data not meeting the quality requirements of this plan will be flagged to identify them to data users and appropriately qualified.

5.4 Project Documentation

A field log will be maintained to record sample collection activities. Whenever a sample is collected or a measurement is made, a detailed description of the sample location and any additional observations will be recorded. The following minimum information will be recorded:

- Site location and sample collection locations;
- The name(s) of the sampling personnel;
- Time and date of the collecting event;
- Prevailing weather conditions; and
- Sampling or analyses problems.

5.5 Data Reduction and Validation

The analytical laboratory will report data by paper copy. Laboratory reports and associated field documentation will be copied and filed.

The following steps will be taken to review the monitoring data:

- Chain of Custody forms and laboratory data sheets will be checked to verify that samples were analyzed within specified holding times. Samples which do not satisfy holding time and preservation requirements will be noted and the reliability of the data assessed.

- The accuracy of chemical data will be evaluated using results from LCS and MS samples prepared by the laboratory. The laboratory will calculate the percent recoveries for these results. If the recoveries are outside the limits presented in this plan, action will be taken by the laboratory to improve the precision of analytical results.

- Finally, all the data will be carefully reviewed for potential transcription errors, detection limit discrepancies (laboratory only), data omissions, and suspect or anomalous values. If such errors or deficiencies are found, the laboratory and/or field sampler will be contacted and the appropriate corrective action taken.

When the review is completed and it is determined that the data are complete and reasonable, the results will be reported to the Agencies.

6.0 REPORTING

Data will be provided in the monthly progress report, as soon the data reduction and review described in Section 5.5 is completed. It is expected that the review will take two weeks or less after the data are received from the laboratory.

7.0 REFERENCES

Bechtel. 1996. *Remedial Investigation Report for the Eastern Michaud Flats Superfund Site*. Bechtel Environmental, Inc. Prepared for FMC Corporation and the J.R. Simplot Company.

Simplot 2002. *Pre-Final Remedial Design Report and Draft Remedial Action Work Plan Dewatering Pit Solids Removal. Simplot Plant Area Eastern Michaud Flats Superfund Site.* Prepared by MFG, Inc.

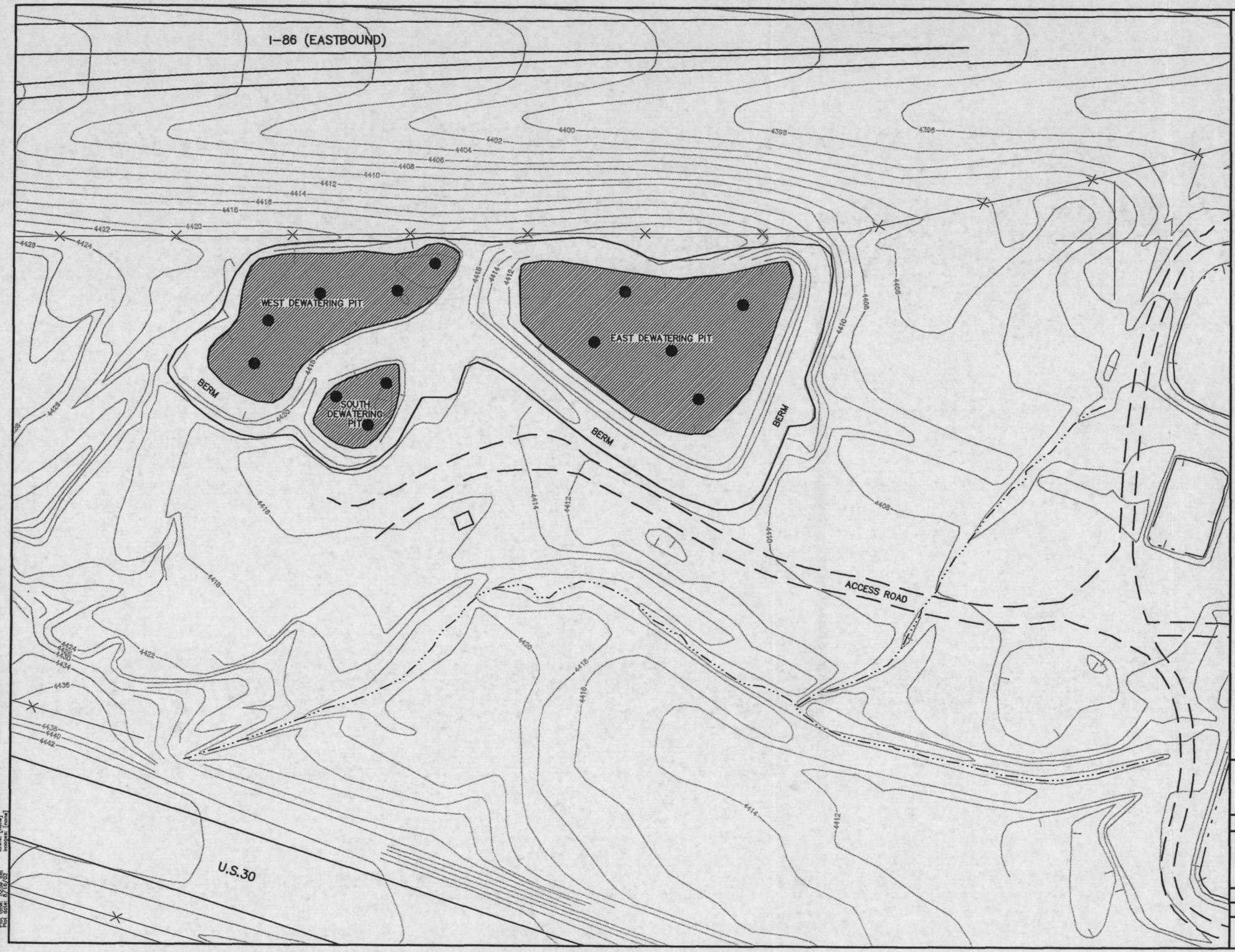
USEPA. 1998. *Record of Decision, Declaration Decision Summary and Responsiveness Summary for Eastern Michaud Flats Superfund Site*. Pocatello, Idaho, US EPA Region 10. June 1998.

USEPA. 2000. *Data Quality Objectives Process for Hazardous Waste Investigations* EPA/600/R-00/007. January 2000.

USEPA. 2002. *Consent Decree for Remedial Design/Remedial Action for the Simplot Plant Area at the Eastern Michaud Flats Superfund Site*. US EPA Region 10. May 9 2002.

FIGURE

FIGURES



LEGEND:

- APPROXIMATE AREA OF RESIDUALS
- APPROXIMATE SAMPLING LOCATIONS

N

SCALE

400 0 400 FEET

SIMPLOT PLANT AREA
EASTERN MICHAUD FLATS
SUPERFUND SITE
POCATELLO, IDAHO

DEWATERING PIT

FIGURE 1

DEWATERING PIT SAMPLING LOCATIONS

PROJECT: 010121.4	DATE: AUGUST 2002
REV:	BY: SCG CHECKED: ACK

MFG, Inc.
consulting scientists and engineers

Plot time: 10:59 am
Plot date: 8/16/02
Xrefs: (none)
Images: (none)
010121 Vol

APPENDIX A

APPENDIX A

STANDARD OPERATING PROCEDURES

MFG, Inc.

STANDARD OPERATING PROCEDURE No. 1

FIELD DOCUMENTATION

1.0 SCOPE AND APPLICABILITY

This Standard Operating Procedure (SOP) describes the protocol for documenting field activities. MFG field personnel shall document field activities on formatted field records and other appropriate data sheets. These formatted record and data sheets will be part of the MFG project file; all forms must be filled out carefully and completely by one of the personnel actually performing the field activities.

2.0 PROCEDURES

2.1 Daily Field Record

The MFG field representative will prepare a Daily Field Record form (Figure SOP-1-1) for each day of field work. Documentation on the multiple-page form will include:

A. Project identification;

B. Date;

C. Time on job (beginning and ending time);

D. Weather conditions;

E. Activity description;

F. List of personnel and visitors on site;

G. Safety equipment used and monitoring performed;

H. Waste storage inventory (if any);

I. Chronological record of activities and events;

J. Comments and variances from project work plan;

K. Content of telephone conversations; and

L. Signature of the MFG field representative.

The MFG field representative will document all details that would be necessary to recreate the day's activities and events at a later time, using as many additional sheets as necessary. The Daily Field Record also will be used to document field activities that may not be specified on other field record forms. Other activity-specific documentation requirements to be recorded on the Daily Field Record are discussed in the MFG Standard Operating Procedure for each activity.

3.0 DOCUMENTATION

3.1 Field Record Forms

In addition to the Daily Field Record, MFG field personnel will complete specific MFG field record forms applicable to the field activities being conducted. The procedures for completion of activity-specific field record forms are presented in the applicable MFG Standard Operating Procedures. MFG field record forms include:

- Daily Field Record (SOP No. 1);
- Chain-of-Custody Record and Request for Analysis (SOP No. 2);
- Field Log of Borehole by Cuttings (SOP No. 4);
- Field Log of Borehole by Coring (SOP No. 4);
- UST Closure Field Record (SOP No. 3);
- Well Construction Summary (SOP No. 6);
- Well Development Record (SOP No. 7);

- Geophysical Log (SOP No. 5);
- Water Level Monitoring Record (SOP No. 11);
- Pumping Test Record (SOP No. 14);
- Eh Data Sheet (SOP No. 13);
- Groundwater Sampling Record (SOP No. 12); and
- Surface Water Sampling Record (SOP No. 12).

Additional field record forms and applicable procedures may be created for project-specific activities, as necessary.

3.2 Records Management

All original field forms will be filed with the appropriate project's records.

4.0 QUALITY ASSURANCE

4.1 Form Review and Filing

All completed field forms will be reviewed by the Project Manager or project designated QA/QC reviewer. Any necessary corrections will be made in pen with a single-line strike out that is initialed and dated.

DAILY FIELD RECORD

DATE:

PAGE 1 of _____

Project No.: _____ Project Name: _____

Location: _____ Time on Job: _____ AM PM to: _____ AM PM

Weather Conditions: _____

Activity: _____

PERSONNEL ON SITE

Name	Company	Time In	Time Out

VISITORS ON SITE

Name	Company/Agency	Time In	Time Out

PERSONAL SAFETY

	Protective Gloves		Hard Hat		Tyvek Coveralls (W/Y)
	Protective Boots		Safety Goggles/Glasses		Air Purifying Respirator

Other Safety Equipment (describe):

Monitoring Equipment:

Field Calibration:

WASTE STORAGE INVENTORY

Container Type	Container ID	Description of Contents and Quantity	Location

Number of empty drums on Site: Location of drums stored on Site:

Signature of Field Representative: Date: _____

Notes: _

Revision 5/25/00

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FIGURE SOP-1-1. DAILY FIELD RECORD

DAILY FIELD RECORD (continued)	DATE:	PAGE _____ of _____

TIME	DESCRIPTION OF DAILY ACTIVITIES & EVENTS

COMMENTS & CHANGES FROM WORK PLAN

TIME	TELEPHONE CONVERSATION RECORD

Signature of Field Representative:

Revision 5/25/00

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FIGURE SOP-1-1. DAILY FIELD RECORD

MFG, Inc.

STANDARD OPERATING PROCEDURE No. 2

SAMPLE CUSTODY, PACKAGING AND SHIPMENT

1.0 SCOPE AND APPLICABILITY

This Standard Operating Procedure (SOP) describes the protocol to be followed for sample custody, packaging and shipment. The procedures presented herein are intended to be general in nature. If warranted, appropriate revisions may be made when approved in writing by the MFG Project Manager.

This SOP applies to any liquid or solid sample that is being transported by the sampler, a courier or an overnight delivery service.

2.0 PROCEDURES

The objectives of this packaging and shipping SOP are: to minimize the potential for sample breakage, leakage or cross contamination; to provide for preservation at the proper temperature; and to provide a clear record of sample custody from collection to analysis.

2.1 Packaging Materials

The following is a list of materials that will be needed to facilitate proper sample packaging:

- X Chain-of-Custody Record forms (see Figure SOP-2-1);
- X Coolers (insulated ice chests) or other shipping containers as appropriate to sample type;
- X Transparent packaging tape;
- X Zip-lock type bags (note: this is used as a generic bag type, not a specific brand name);

X Protective wrapping and packaging material;

X Contained ice (packaged and sealed to prevent leakage when melted) or "Blue Ice"; and

X Chain-of-Custody seals.

2.2 Sample Custody from Field Collection to Laboratory

After samples have been collected, they will be maintained under chain-of-custody procedures. These procedures are used to document the transfer of custody of the samples from the field to the designated analytical laboratory. The same chain-of-custody procedures will be used for the transfer of samples from one laboratory to another, if required.

The field sampling personnel will complete a Chain-of-Custody Record and Request for Analysis form (CC/RA form, Figure SOP-2-1) for each separate container of samples to be shipped or delivered to the laboratory for chemical or physical (geotechnical) analysis. Information contained on the triplicate, carbonless form will include:

1. Project identification;
2. Date and time of sampling;
3. Sample identification;
4. Sample matrix type;
5. Sample preservation method(s);
6. Number and types of sample containers;
7. Sample hazards (if any);
8. Requested analysis(es);
9. Requested sample turnaround time;
10. Method of shipment;
11. Carrier/waybill number (if any);

12. Signature of sampling personnel;

13. Name of MFG Project Manager;

14. Signature, name and company of the person relinquishing and the person receiving the samples when custody is being transferred;

15. Date and time of sample custody transfer; and

16. Condition of samples upon receipt by laboratory.

The sample collector will cross out any blank space on the CC/RA form below the last sample number listed on the part of the form where samples are listed. The samples will be carefully packaged into shipping containers/ice chests.

The sampling personnel whose signature appears on the CC/RA form is responsible for the custody of a sample from time of sample collection until the custody of the sample is transferred to a designated laboratory, a courier, or to another MFG employee for the purpose of transporting a sample to the designated laboratory. A sample is considered to be in their custody when the custodian: (1) has direct possession of it; (2) has plain view of it; or (3) has securely locked it in a restricted access area.

Custody is transferred when both parties to the transfer complete the portion of the CC/RA form under "Relinquished by" and "Received by." Signatures, printed names, company names, and date and time of custody transfer are required. Upon transfer of custody, the MFG sampling personnel who relinquished the samples will retain the third sheet (pink copy) of the CC/RA form. When the samples are shipped by a common carrier, a Bill of Lading supplied by the carrier will be used to document the sample custody, and its identification number will be entered on the CC/RA form. Receipts of Bills of Lading will be retained as part of the permanent documentation in the MFG project file.

2.3 Sample Custody Within Laboratory

The designated laboratory will assume sample custody upon receipt of the samples and CC/RA form. Sample custody within the analytical laboratory will be the responsibility of designated laboratory personnel. The laboratory will document the transfer of sample custody and receipt by the laboratory by signing the correct portion of the CC/RA form. Upon receipt, the laboratory sample custodian will note the condition of the samples, by checking the following items:

1. Agreement of the number, identification and description of samples received by comparison with the information on the CC/RA form; and

2. Condition of samples (no air bubbles in VOA containers; any bottle breakage; leakage, cooler temperature, etc.).

If any problems are discovered, the laboratory sample custodian will note this information on the "Laboratory Comments/Condition of Samples" section of the CC/RA form, and will notify the MFG sampling personnel or Project Manager immediately. The MFG Project Manager will decide on the final disposition of the problem samples.

The laboratory will retain the second sheet (yellow copy) of the CC/RA form and return the first sheet (white original) to MFG with the final laboratory report of analytical results. The original of the CC/RA form will be retained as part of the permanent documentation in the MFG project file.

A record of the history of the sample within the laboratory containing sample status and storage location information will be maintained in a logbook, or a computer sample tracking system, at the laboratory. The following information will be recorded for every sample access event:

1. Sample identification;

2. Place of storage;

3. Date(s) and time(s) of sample removal and return to storage;

4. Accessor's name and title;

5. Reason for access; and

6. Comments/observations (if any).

The laboratory will provide MFG with a copy of the logbook or computer file information pertaining to a sample upon request.

2.4 Sample Custody During Inter-Laboratory Transfer

If samples must be transferred from one laboratory to another, the same sample custody procedures discussed above will be followed. The designated laboratory person (sample custodian) will complete a CC/RA Record (MFG form or similar) and sign as the originator. The laboratory relinquishing the sample custody will retain a copy of the completed form. The laboratory receiving sample custody will sign the form, indicating transfer of custody, retain a copy, and return the original record to MFG with the final laboratory report of analytical results. The CC/RA Record will be retained as part of the permanent documentation in the MFG project file.

2.5 Packaging and Shipping Procedure

Be sure that all sample containers are properly labeled and all samples have been logged on the Chain-of-Custody Request for Analysis form (CC/RA, SOP-2-1) in accordance with the procedures explained above and in the MFG SOPs entitled WATER QUALITY SAMPLING and SOIL/SEDIMENT SAMPLING FOR CHEMICAL ANALYSIS.

All samples should be packed in the cooler so as to minimize the possibility of breakage, cross-contamination and leakage. Before placing the sample containers into the cooler, be sure to check all sample bottle caps and tighten if necessary. Bottles made of breakable material (e.g., glass) should also be wrapped in protective material (e.g., bubble wrap, plastic gridding, or foam) prior to placement in the cooler. Place each bottle or soil liner into two zip-lock bags to protect from cross-contamination and to keep the sample labels dry. Place the sample containers upright in the cooler. Avoid stacking glass sample bottles directly on top of each other.

If required by the method, samples should be preserved to 4°C prior to the analysis. Water ice or "blue ice" will be used to keep the sample temperatures at 4°C. The ice will be placed in two zip-lock bags if the samples are to be transported by someone other than the MFG sampler (e.g., a courier or overnight delivery service). Place the zip-lock bags of ice in between and on top of the sample containers so as to maximize the contact between the containers and the bagged ice. If the MFG sampler is transporting the samples to the laboratory shortly after sample collection, the water ice may be poured over and between the sample bottles in the cooler.

If there is any remaining space at the top of the cooler, packing material (e.g., styrofoam pellets or bubble wrap) should be placed to fill the balance of the cooler. After filling the cooler, close the top and shake the cooler to verify that the contents are secure. Add additional packaging material if necessary.

When transport to the laboratory by the MFG sampler is not feasible, sample shipment should occur via courier or overnight express shipping service that guarantees shipment tracking and next morning delivery (e.g., Federal Express Priority Overnight). In this case, place the chain-of-custody records in a zip-lock bag and place the bag on top of the contents within the cooler. Tape the cooler shut with packaging tape. Packaging tape should completely encircle the cooler, and a chain-of-custody seal should be signed and placed across the packaging tape, and across at least one of the opening points of the container.

Retain copies of all shipment records provided by the courier or overnight delivery service and maintain in the project's file.

2.6 Documentation and Records Management

Daily Field Records or a field notebook with field notes will be kept describing the packaging procedures and the method of shipments. Copies of all shipping records and chain-of-custody records will be retained in the project files.

3.0 QUALITY ASSURANCE

The Project Manager or designated QA reviewer will check and verify that documentation has been completed and filed per this procedure.

CHAIN-OF-CUSTODY RECORD AND REQUEST FOR ANALYSIS

MFG, INC. COC No. _____

Austin Office
8900 Business Park Dr.
Austin, TX 78759
TEL: (512) 338-1667
FAX: (512) 338-1331

Boston Office
500 W Cummings Park
Suite #1050
Woburn, MA 01801
TEL: (781) 937-0500
FAX: (781) 937-0578

Boulder Office
4900 Pearl E. Circle
Suite #300W
Boulder, CO 80301
TEL: (303) 447-1823
FAX: (303) 447-1836

Missoula Office
215 S. 3rd St. West
Missoula, MT 59801
TEL: (406) 728-4600
FAX: (406) 728-4698

Osburn Office
809 E. Mullan Avenue
Osburn, ID 83849
TEL: (208) 556-6811
FAX: (208) 556-7271

Port Lavaca Office
320 E. Main
Port Lavaca, TX 77979
TEL: (512) 552-8839
FAX: (512) 553-6115

San Francisco Office
71 Stevenson St. #1450
San Francisco, CA 94105
TEL: (415) 495-7110
FAX: (415) 495-7107

Seattle Office
19203 36th Avenue W
Suite #101
Lynnwood, WA 98036
TEL: (425) 778-8252
FAX: (425) 771-8842

PROJECT NO.: _____ PROJECT NAME: _____ PAGE: _____ OF: _____

SAMPLER (Signature): _____ PROJECT MANAGER: _____ DATE: _____

METHOD OF SHIPMENT: _____ CARRIER/WAYBILL NO.: _____ DESTINATION: _____

SAMPLES														ANALYSIS REQUEST							
		Sample Collection			Preservation						Containers			Constituents/Method					Handling			Remarks
Lab No.	Field Sample Identification	DATE	TIME	Matrix*	HCl	HNO_3	H_2SO_4	COLD		FILTRATION*	VOLUME (ml/oz)	TYPE*	NO.						HOLD	RUSH	STANDARD	
	TOTAL NUMBER OF CONTAINERS													LABORATORY COMMENTS/CONDITION OF SAMPLES					Cooler Temp:			

RELINQUISHED BY:			DATE	TIME	RECEIVED BY:		
SIGNATURE	PRINTED NAME	COMPANY			SIGNATURE	PRINTED NAME	COMPANY
							LABORATORY

*KEY: Matrix: AQ - aqueous NA - nonaqueous SO - soil SL - sludge P - petroleum A - air OT - other Containers: P - plastic G - glass T - teflon B - brass OT - other Filtration: F - filtered U - unfiltered

DISTRIBUTION: PINK: Field Copy YELLOW: Laboratory Copy WHITE: Return to Originator

FIGURE SOP-2-1. CHAIN-OF-CUSTODY RECORD AND REQUEST FOR ANALYSIS

MFG, Inc.

STANDARD OPERATING PROCEDURE No. 16

EQUIPMENT DECONTAMINATION

1.0 SCOPE AND APPLICABILITY

This Standard Operating Procedure (SOP) describes the methods to be used for the decontamination of all reusable field equipment which could become contaminated during use or during sampling. The equipment may include split spoons, bailers, trowels, shovels, hand augers or any other type of equipment used during field activities.

Decontamination is performed as a quality assurance measure and a safety precaution. It prevents cross contamination between samples and also helps to maintain a clean working environment.

Decontamination is achieved mainly by rinsing with liquids which may include: soap and/or detergent solutions, tap water, distilled weak acid solution, and/or methanol or other solvent. Equipment may be allowed to air dry after being cleaned or may be wiped dry with chemical-free towels or paper towels if immediate re-use is necessary.

At most project sites, decontamination of equipment that is re-used between sampling locations will be accomplished between each sample collection point. Waste produced by decontamination procedures, including waste liquids, solids, rags, gloves, etc., should be collected and disposed of properly, based upon the nature of contamination. Specific details for the handling of decontamination wastes are addressed in the MFG SOP entitled STORAGE AND DISPOSAL OF SOIL, DRILLING FLUIDS AND WATER GENERATED DURING FIELD WORK or may be specified by a project plan.

2.0 PROCEDURES

2.1 Responsibilities

It is the responsibility of the field sampling coordinator to ensure that proper decontamination procedures are followed and that all waste materials produced by decontamination are properly managed. It is the responsibility of the project safety officer to draft and enforce safety measures which provide the best protection for all persons involved directly with sampling and/or decontamination.

It is the responsibility of any subcontractors (i.e., drilling contractors) to follow the proper, designated decontamination procedures that are stated in their contracts and outlined in the Site-Specific Health and Safety Plan. It is the responsibility of all personnel involved with sample collection or decontamination to maintain a clean working environment and ensure that any contaminants are not negligently introduced to the environment.

2.2 Supporting Materials

1. Cleaning liquids: soap and/or detergent solutions (Alconox, etc.), tap water, distilled water, methanol, weak nitric acid solution, etc.
2. Personal protective safety gear as defined in the Site-Specific Health and Safety Plan.
3. Chemical-free towels or paper towels.
4. Disposable, nitrile gloves.
5. Waste storage containers: drums, boxes, plastic bags, etc.
6. Cleaning containers: plastic and/or stainless steel pans and buckets.
7. Cleaning brushes.
8. Aluminum foil.

2.3 Methods

The extent of known contamination will determine the degree of decontamination required. If the extent of contamination cannot be readily determined, cleaning should be done according to the assumption that the equipment is highly contaminated. Decontamination procedures should account for the types of contaminants known or suspected to be present. In general, high levels of organic contaminants should include an organic solvent wash step, and high levels of metals contamination should include a weak acid rinse step.

The procedures listed below constitute the full field decontamination procedure. If different or more elaborate procedures are required for a specific project, they may be specified in sampling and analysis or work plan. Such variations in decontamination protocols may include all, part or an expanded scope of the decontamination procedure stated herein.

1. Remove gross contamination from the equipment by dry brushing, and rinse with tap water.
2. Wash with soap or laboratory-grade detergent solution.
3. Rinse with tap water.
4. Rinse with methanol (optional, for equipment potentially contaminated by organic compounds).
5. Rinse with acid solution (optional, for equipment potentially contaminated by metals).
6. Rinse with distilled or deionized water.
7. Repeat entire procedure or any parts of the procedure as necessary.
8. Air dry.

Decontaminated equipment should be stored in sealable containers, such as Ziplock-type plastic bags or cases or boxes with lids.

2.4 DOCUMENTATION

Field notes will be kept describing the decontamination procedures followed. The field notes will be recorded according to procedures described in the MFG SOP entitled FIELD DOCUMENTATION.

3.0 QUALITY CONTROL

To assess the adequacy of decontamination procedures, field rinsate blanks may be collected. The specific number of rinsate blanks will be defined in a sampling and analysis or work plan or by the MFG project manager. In general, at least one field rinsate blank should be collected per sampling event or per day.

Rinsate blanks with elevated or detected contaminants will be evaluated by the Project Manager, who will relay the results to the site workers. Such results may be indicative of inadequate decontamination procedures that require corrective actions (e.g., retraining).

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